



# Review of Markedness: Reduction and Preservation in Phonology

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**Paul de Lacy**, *Markedness: Reduction and preservation in phonology* (Cambridge Studies in Linguistics **112**). Cambridge: Cambridge University Press, 2006. Pp. xviii + 447.

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The purpose of this review is to provide an overview of Paul de Lacy's book and an illustrative novel example of a typological application of its model of markedness conflation. In addition, we would like to highlight three areas in which the theory may benefit from refinement and suggest possible avenues for future research.

Since at least Jakobson (1932), the notion that certain features, segments or structures may be asymmetrically MARKED in relation to other features, segments or structures has been significant in linguistic theory, and in ensuing research the term MARKEDNESS has been used in a number of different senses

by various scholars (see Haspelmath 2006, Rice 2007). In this book, de Lacy focuses on competence (or i-language) markedness and proposes a general theory based on the following four principal ideas.

- (1) (a) Markedness is part of grammatical competence.
- (b) There is grammatical pressure to preserve marked elements.
- (c) Markedness distinctions can be conflated (i.e. ignored), but never reversed.
- (d) Markedness hierarchies can conflict, resulting in apparent markedness reversals.

Building on these four ideas, de Lacy develops a set of proposals bundled under the name CoMP (COMpetence, CONflation, hierarchy CONflict, Markedness and Preservation of the marked).

De Lacy's work focuses on only one type of phonological markedness: segmental markedness effects that derive from markedness hierarchies. As a result, traditional markedness constraints that do not relate to hierarchies, particularly those from the domain of syllabic and prosodic structure, including *ONSET*, *CLASH*, and so forth, are outside of the scope of CoMP. De Lacy devotes many pages to explaining how one can distinguish performance markedness from competence markedness, and asserts that much of the debate over defining markedness has resulted from the failure to separate the two. To avoid confusion with the generally accepted use of 'markedness constraints' in Optimality Theory, de Lacy refers to constraints relating to markedness hierarchies as *OUTPUT* constraints.

At the core of CoMP is de Lacy's approach to markedness hierarchies. De Lacy argues that markedness hierarchies are formal objects within the grammar, and like Prince & Smolensky (1993/2004), he assumes that markedness hierarchies are universal. However, while Prince & Smolensky captured this universality through universally fixed rankings of output constraints (e.g. \*[dorsal] >> \*[labial] >> \*[coronal]), de Lacy argues that fixed constraint rankings are not able to account for assimilation, coalescence, and certain types of conflation. Instead, he proposes to account for the universality of markedness hierarchies through limitations on the form that output constraints may take.

Under de Lacy's approach to output constraints, each constraint targets a continuous section of a markedness hierarchy, and must include the most marked member of the hierarchy. As a result, each output constraint targeting a certain feature value also targets every more marked value on the hierarchy. Thus, two output constraints could apply to a binary feature such as [voice]: \*[+voice] (targeting only the most marked member of the hierarchy) or \*[\(\pm\)]voice] (targeting both the unmarked and the marked members). Crucially, no output constraint may target [–voice] alone. De Lacy proposes that faithfulness constraints are similarly established; with respect to the feature [voice], we should find *IDENT*(+voice) and *IDENT*(\(\pm\)]voice), but not

	front	central	back
high	i	ɨ	u
mid	e	ʌ	o
low		ɑ	

*Table 1*

The East Tocharian vowel system (Pinault 1989)

IDENT(–voice). Free ranking of the resulting permitted output constraints and faithfulness constraints results in the attested cross-linguistic diversity, while ensuring that the markedness hierarchy is respected in every language.

While de Lacy's theory is applicable to markedness hierarchies of all types, the results of the theory are clearest with hierarchies containing three or more members, such as the Place of Articulation (PoA) hierarchy and the sonority scale. We will illustrate these effects through discussion of the sonority-driven stress system of East Tocharian (Plaster 2007). East Tocharian (also known as Tocharian A), an Indo-European language that was spoken in the Xinjiang province of China in the sixth to ninth centuries, possessed a sonority-driven stress system, in which stress was preferentially assigned to more sonorous vowels over less sonorous vowels.

The vowel reduction processes that affected East Tocharian [a] and [ʌ] reveal that the vowels fell into (at least) two groups for purposes of accent placement: the non-high (or 'full') vowels and the high (or 'weak') vowels (see table 1). If a word possessed at least one full vowel, the East Tocharian accent fell on the leftmost full vowel. The central full vowels [a] and [ʌ] were subject to vowel reduction when unstressed, surfacing as [ʌ] in the second closed syllable of disyllabic words (as in (2b) below) and as [ɨ] in medial syllables (with syncopation in open syllables, as in (2c)).

- (2) (a) [juk'naʃ] 'he conquers'  
 (b) ['skenaʃ] 'he tries'  
 (c) ['peklune](</pekalune/) 'writing, painting'  
 (d) [tir'kalune] 'release'

The forms in (2a) and (2b) are both third-person singular (3SG) class VI presents in East Tocharian, and contain the 3SG active ending *-aʃ*. The unreduced ending surfaced only in forms such as (2a), where the [a] of the ending was the leftmost full vowel of the form and thus received the accent. In (2b), the leftmost full vowel appears in the initial syllable; as a result, the [a] of the ending was subject to reduction to [ʌ]. Similarly, stress fell on the full vowel in the initial syllable of (2c), leaving the medial [a] susceptible to reduction to the point of syncopation, while the medial [a] of (2d) bore the accent, protecting it against reduction.

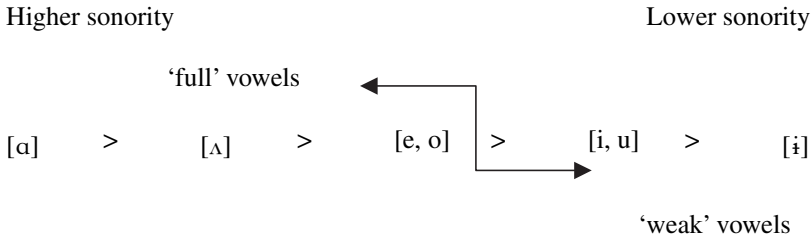


Figure 1  
Sonority of East Tocharian vowels

Plotting the East Tocharian vowels on the sonority hierarchy (see figure 1) demonstrates that the full and weak vowels cluster at opposite ends of the hierarchy. The non-high/full vowels {ɑ, Λ, e, o} were the four most sonorous vowels in the East Tocharian system, while the high vowels {i, u, ɨ} were the three least sonorous vowels. As we see, despite the difference in sonority among each of the full vowels, they were equally preferable for stress placement. In other words, the sonority differences among the full vowels were ignored: stress preferentially fell on any vowel at least as sonorous as [e, o]. For example, although East Tocharian [ɑ] was more sonorous than [e], stress fell on the initial syllable of /pékalune/ ‘writing, painting’, despite the presence of the more sonorous [ɑ] in the second syllable, which then fell subject to reduction and syncope.

The conflation of the three upper contiguous levels of the sonority hierarchy seen in the East Tocharian stress system follows directly from de Lacy’s theory. In this theory, each level of sonority in the East Tocharian vowel system corresponds to an output constraint banning vowels equal to or below a certain sonority level from bearing primary stress (that is, serving as the Designated Terminal Element of the foot ( $\Delta_{FT}$ )). The lower a vowel’s sonority, the more marked it is in DTE<sub>FT</sub> position; accordingly [ɨ] is the most marked member of the hierarchy for this purpose and each output constraint must ban a continuous string of vowels that includes [ɨ]. Since the East Tocharian vowels fall on five separate levels of sonority, there would be five output constraints:  $*\Delta_{FT} \leq \{i\}$ ,  $*\Delta_{FT} \leq \{i, u\}$ ,  $*\Delta_{FT} \leq \{e, o\}$ ,  $*\Delta_{FT} \leq \{\Lambda\}$ ,  $*\Delta_{FT} \leq \{\alpha\}$ . The vowels banned from DTE<sub>FT</sub> position by each constraint are identified in (3):

- (3)  $*\Delta_{FT}$  constraints and corresponding banned segments in DTE<sub>FT</sub> position
- (a)  $*\Delta_{FT} \leq \{i\}$     {i}
  - (b)  $*\Delta_{FT} \leq \{i, u\}$     {i, u, ɨ}
  - (c)  $*\Delta_{FT} \leq \{e, o\}$     {e, o, i, u, ɨ}
  - (d)  $*\Delta_{FT} \leq \{\Lambda\}$     {Λ, e, o, i, u, ɨ}
  - (e)  $*\Delta_{FT} \leq \{\alpha\}$     {ɑ, Λ, e, o, i, u, ɨ}

Categories				Languages
ə	i/u	e/o	a	Kobon (Davies 1981)
ə	i/u	e/o	a	Gujarati (de Lacy 2002, and the book under review)
ə	i/u	e/o	a	Pichis Ashéninca (Payne 1990)
ə	i/u	e/o	a	Yil (Martens & Tuominen 1977)
ə	i/u	e/o	a	_____
ə	i/u	e/o	a	Nganasan (de Lacy 2004)
ə	i/u	e/o	a	Kara (Schlie & Schlie 1993, de Lacy 1997)
ə	i/u	e/o	a	All vowels are treated the same.

*Table 2*  
Head-sonority conflation typology (244)

As (3) shows, [i] is banned as DTE<sub>FT</sub> by each output constraint, [i,u] are banned by all but one, and so on. As a result, the markedness hierarchy is preserved regardless of the ranking of the constraints; it is impossible to rank the constraints so that, for example, [i] will be preferentially stressed over [e, o]. In addition, while free ranking would predict that languages could possess any number of sonority distinctions – from treating all vowels identically, as found in languages without sonority-driven stress, to treating each level of sonority separately (as found in Kobon, see Davies 1981) – the form of the output constraints correctly predicts that no language may conflate vowels that are not adjacent on the sonority hierarchy. A chart showing the resulting typology is reproduced in table 2.

With this markedness hierarchy and set of output constraints in hand, placement of stress in East Tocharian on the leftmost full vowel can be explained through the interaction of two constraints. (For a complete analysis of the East Tocharian stress system and its interaction with vowel reduction, we direct the reader to Plaster 2007.)

First, since stress seeks out the leftmost full vowel, EDGEMOST must be active.

(4) EDGEMOST(acute;L)

A stressed syllable occurs at the L edge of the Word.

(Prince & Smolensky 1993/2004)

The second active constraint is  $*\Delta_{FT} \leq \{i, u\}$ , which bans a vowel with sonority equal to or less than that of [i, u] from bearing stress. The interaction of these constraints is shown in the tableaux provided in (5) and (6).

(5) East Tocharian: [juknacute;f]

/juknacute;f/	$*\Delta_{FT} \leq \{i, u\}$	EDGEMOST(acute;L)
✓ (a) ju(acute;'knacute;f)		*
(b) (acute;'juknacute;f)	*!	

(6) East Tocharian: [skénacute;f]

/skénacute;f/	$*\Delta_{FT} \leq \{i, u\}$	EDGEMOST(acute;L)
(a) ske(acute;'nacute;f)		*!
✓ (b) (acute;'skénacute;f)		

In summary, East Tocharian stresses the leftmost vowel of a given conflated level of sonority; the system is not sensitive to distinctions among vowels within the conflated part of the hierarchy.

De Lacy's analyses are well argued and replete with examples and in-depth case studies. Chapter 8, 'Predictions and alternatives', is devoted to a discussion of the predictions made by CoMP, expressly outlining what would be necessary to disprove the theory. De Lacy has thought through his arguments very well, and his discussions of alternative theories and potential counter-examples to his predictions are quite cogent. Nonetheless, we would like to identify three assumptions made in this book for which we believe alternate analyses are desirable, and propose routes for such alternate analyses.

First, we like to flag the issue of de Lacy's proposed nasal glottal stop for further inquiry. De Lacy argues for the existence of two glottal nasals (37). The first is the nasalized glottal continuant [ɦ̃], which he posits as the equivalent to the 'placeless nasal glide' or *anusvara* discussed by Trigo-Ferre (1988). However, to account for the many cases of apparent neutralizations of nasal segments to a velar nasal, epenthesis of velar nasals, and the

assimilation of nasals to velar nasals when adjacent to glottal segments (see 39f.), all of which would appear to contradict the highly marked status of the [dorsal] feature, de Lacy argues that these cases actually involve a nasal glottal stop [N]. Although a nasal glottal stop would be expected to be an articulatory impossibility under the generally accepted notion of [glottal] place, de Lacy proposes that

the [glottal] feature can be interpreted as requiring an absence of consonantal constriction downstream from the sound source ... In short, the implementation of [glottal] for nasals effectively calls for the most direct route from the glottis to the nostrils via the pharyngeal and nasal airways. (38)

This revised view of the [glottal] feature raises several concerns.

First, this redefinition of [glottal] effectively converts what is generally agreed to be a place feature – and which de Lacy himself views as part of the PoA hierarchy – into an amorphous manner feature. Under this definition, [glottal] no longer refers to a place of constriction, but instead to either (i) a manner of articulation (‘produce the segment with the most direct, unobstructed airflow to the exit’) or (ii) a combination of instructions for the total absence of obstruction in one location and total obstruction in another (oral: ‘block the nasal cavity and don’t block the oral cavity’; nasal: ‘block the oral cavity and don’t block the nasal cavity’). If a nasal glottal stop is indeed part of a language’s phoneme inventory, it seems that the desired effect could be accomplished while still maintaining [glottal] as a place feature by defining [glottal] as referring to a ‘non-oral place of constriction’. Under such a definition, the precise location of the constriction outside (or at the edge) of the oral cavity would be left up to other features of the segment, e.g. [+nasal, +glottal] would specify a non-oral constriction and airflow through the nostrils.

An alternate way of thinking about the problem of apparent velar nasal epenthesis and neutralization to velar nasals is to allow the PoA hierarchy for nasal segments to diverge from that of non-nasal segments. If de Lacy is correct in positing a nasal glottal stop, the segment is sufficiently similar to a velar nasal to have prevented anyone prior to de Lacy from identifying it; moreover, this perceptual confusability would be between the most and least marked members of the PoA hierarchy. To the extent that the PoA hierarchy is grounded perceptually or articulatorily, it is not clear that [dorsal] and [glottal] should be at opposite ends of the PoA hierarchy for nasal segments. De Lacy himself points out later in the book that there is no relation between different manners of articulation for different points of articulation, and suggests that manner-specific PoA constraints, such as \*{dorsal, labial, coronal}/nasal, may exist (71f.). While we concur with de Lacy about the absence of relation between manners of articulation and points of articulation, we would like to suggest that the PoA hierarchy resulting from the combination



of non-nasal manner of articulation with place features may differ from that found with the combination of nasal manner of articulation with place features. While [dorsal] place may be the most marked place for non-nasal segments, a context-sensitive theory of markedness might admit the possibility that [dorsal] is not a marked place feature for nasal segments.

This latter point relates to the important, though often neglected, notion of CONTEXT-SENSITIVE markedness. It is often not sufficient to say that *x* is the most marked feature on the hierarchy without considering the subsegmental context within which *x* occurs. Consider for example, the pattern of vowel harmony found for the feature [round] in Kirgiz, as first described and discussed by Hebert & Poppe (1963). Kirgiz allows [round] harmony to change [–high, +back, –round] /a/ into [–high, +back, +round] [o] when the trigger is [o] or [y]. Surprisingly, however, [u] cannot induce round harmony. While all three vowels [o, y, u] possess the feature [+round], only the first two can induce its spreading. Vaux (1993) proposes that [+round] is context-sensitively marked in the presence of [–back] (i.e. [y]) and in the presence of [–high] (i.e. [o]), and that Kirgiz rounding harmony is limited to triggers that have marked instances of [+round]. This constitutes another case in which the accuracy of segmental markedness theory is enriched by considering other contextual subsegmental features, much like the case above in which we propose that [dorsal] may be marked only when in the context of [–nasal].

Our second point of concern relates to de Lacy's suggestion that glottals are the most sonorous consonantal segments, as shown in the consonantal sonority hierarchy reproduced in (7).

- (7) *Consonant sonority*  
 voiceless stops > voiced stops > voiceless fricatives >  
 voiced fricatives > nasals > liquids > glides > glottals

Given that de Lacy posits [glottal] as the least marked place feature, as discussed above, he must also make it the most sonorous manner in order to explain an issue that arises with consonant epenthesis. Languages such as Axininca Campa (Payne 1981, Prince & Smolensky 1993/2004) epenthesize [t] to satisfy ONSET, even though the PoA scale would dictate that the glottal stop should be the least-marked choice. By identifying glottals as the most sonorous consonants, de Lacy is able to prevent them from occurring as epenthetic onsets through a restriction on the sonority of onset segments.

However, de Lacy's sole empirical basis for the placement of glottals high on the consonant sonority hierarchy is the existence of phenomena where glottal segments pattern with highly sonorous segments, such as glides and liquids. For example, de Lacy states that 'in sonority-distance relations, glottals usually act like highly sonorous elements' (96), citing a restriction in Gujarati that allows only glides, liquids and [h] as the second member of onset clusters, which is the analysis set forth in Cardona (1965). However, the

*h* written in transcriptions of Gujarati onsets is not a separate segment – it is used to indicate that the previous stop is aspirated; only glides and liquids can occur as the second member of onset clusters (Cardona & Suthar 2003: 663–667). As a result, especially given the generally accepted association of sonority with loudness or intensity (Parker 2002: 106), we do not agree that the phonological evidence supports the assertion that glottals are highly sonorous.

Rather, we see two potential paths of explanation for the preference of some languages for coronal epenthesis over glottal epenthesis. First, while high-sonority segments may be less preferable as onsets than low-sonority segments, this does not require that sonority differences underlie the preference for coronal stop epenthesis over glottal stop epenthesis. Glottal stops differ from coronal stops in a number of other ways, including intensity of release burst and lack of formant transitions. Thus, it may be possible to identify a characteristic – even if not a subsegmental phonological feature – that would favor non-glottal epenthesis (see, for example, Borroff 2007).

The second possible path of explanation would be to note, as de Lacy does, that the sole glottal segment in the Axininca Campa inventory is [h]; no Axininca Campa form contains [ʔ]. Given that [glottal] is not otherwise activated in the inventory, we might expect [h] to pattern with the voiceless fricatives, and as a result to be more sonorous than the voiceless stops. Indeed, as Herd (2005) shows, in languages without [ʔ], such as Maori, [h] patterns as a voiceless fricative, and is thereby the segment chosen to replace /s/ in loanwords from English. Thus in Axininca Campa, given the choice between epenthesizing the fricative [h] and the stop [t], the language opts for the less sonorous element [t].

A final suggestion that we would like to make relates to de Lacy's conception of multi-valued features, which is necessary for the implementation of his theory with markedness hierarchies that have more than two members, including the PoA and sonority hierarchies.

(8) *Multi-valued feature hierarchy for PoA*

dorsal:   XXX place  
labial:   XXO place  
coronal:  XOO place  
glottal:  OOO place

Under this view, output and faithfulness constraints relate to Xs; \*XX is equivalent to \*{dorsal, labial}, since these are the two places of articulation that contain at least XX, and IDENT(X) is equivalent to IDENT{dorsal, labial, coronal} for the same reason. As a result, the theory predicts that it is not possible, for example, for labials to be MORE marked than dorsals, since both are XX place.

The XO format adopted by de Lacy for multi-valued features is expressed in terms of abstract Xs and Os, but the possibility remains that one can

identify the nature of the actual feature(s) expressed in XO terms. For example, the Xs could be given content in terms of number of marked features, either in context-free or context-sensitive terms. For example, suppose that [–glottal] is a marked feature, that [–coronal] in the context of [–glottal] is a marked feature, and that [+lingual] in the context of [–coronal] is a marked feature:

- |     |   |                          |
|-----|---|--------------------------|
| (9) | [–coronal, –lingual, +glottal]: glottal | <i>0 marked features</i> |
|     | [+coronal, +lingual, –glottal]: coronal | <i>1 marked feature</i>  |
|     | [–coronal, –lingual, –glottal]: labial  | <i>2 marked features</i> |
|     | [–coronal, +lingual, –glottal]: dorsal  | <i>3 marked features</i> |

Alternatively, if the scale were identified as derived from the relative perceptual salience of the places of articulation (see, for example, Jun 1995), we could have the feature values set forth in (10).

- (10) PoA hierarchy
- |          |                       |
|----------|-----------------------|
| dorsal:  | 3 perceptual salience |
| labial:  | 2 perceptual salience |
| coronal: | 1 perceptual salience |

Under such an approach, the PoA hierarchy would result from the relative perceptual salience of these place features, and formal mechanisms of the grammar would cause the preservation and elimination of marked values. For example, the markedness of labials and dorsals could result from the markedness associated with achieving perceptual salience  $\geq 2$ , while a faithfulness constraint preserving dorsal, labial and coronal place features would preserve segments with perceptual salience  $\geq 1$ .

The identification of a set of phonological or phonetic features underlying de Lacy's abstract 'noughts-and-crosses' calculus of markedness could provide more predictive insight into the hierarchy of languages with greater or fewer numbers of place of articulation. Under a purely innatist view of markedness hierarchies, the existences of languages like Gujarati, which possesses seven places of articulation – glottal, velar, palatal, postalveolar (retroflex), alveolar, dental and labial – would require the innate PoA hierarchy to include all possible places of articulation under a particular universal ordering (with the possibility of conflation). Yamane-Tanaka (2007) has already observed that de Lacy's PoA hierarchy needs to be more fine-grained in distinguishing velars from uvulars. De Lacy's discussion of palatals in this book is limited, at times treating them as coronals and at other times as dorsals. Identification of the characteristics of the scale underlying the PoA hierarchy, even if such a scale is not reducible to a single feature, could lead to a more satisfactory explanation both for the relative markedness rankings of the possible places of articulation and for the posited universality of these rankings.

In conclusion, this book sets forth a richly researched and thoroughly developed theory of typological variation in markedness effects such as neutralization, epenthesis, and assimilation. The theoretical mechanism of conflation between various adjacent points along markedness hierarchies provides a constrained and broadly applicable theory of cross-linguistic patterning. More extensive elaboration of the PoA hierarchy and the integration of context-sensitive markedness into the theory are two directions that further development of this framework could embark upon.

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